

N°1169 / PC

TOPIC(s) : Alternative solvents / Catalytic systems

## Highly Selective Cyclohexane Oxidation Catalyzed by Ferrocene in Ionic Liquid Medium

### AUTHORS

Ana RIBEIRO / CENTRO DE QUÍMICA ESTRUTURAL, INSTITUTO SUPERIOR TÉCNICO, UNIVERSIDADE DE LISBOA, AV ROVISCO PAIS, LISBPA

Luísa M.D.R.S. MARTINS / ISEL - INSTITUTO SUPERIOR DE ENGENHARIA DE LISBOA, INSTITUTO POLITÉCNICO DE LISBOA, AV. CONSELHEIRO EMÍDIO NAVARRO, 1,, LISBOA

Armando J.L. POMBEIRO / CENTRO DE QUÍMICA ESTRUTURAL, INSTITUTO SUPERIOR TÉCNICO, UNIVERSIDADE DE LISBOA, AV ROVISCO PAIS, LISBOA

### PURPOSE OF THE ABSTRACT

The partial oxidation of cyclohexane by aqueous tert-butyl hydroperoxide in phosphonium ionic liquid medium [P6.6.6.14][DCA] and in the presence of catalytic amounts of ferrocene was investigated. The reaction proceeded during 2 h at room temperature with high selectivity (> 98%), yielding mainly cyclohexanone (up to 16%) with total TOFs up to  $1 \times 10^4$  h<sup>-1</sup>. The combination of a commercial iron-complex catalyst (ferrocene) and well-adjusted unconventional reaction conditions led to a highly selective, fast and reusable catalytic system for the mild oxidation of cyclohexane. Moreover, the found [Fe(C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>] / [P6.6.6.14][DCA] catalytic system can be of applied significance to produce polyamide 6.

Therefore, with this work we will discuss the new possibilities in the application of RTILs to selective oxidation catalysis.

Acknowledgments: This work has been partially supported by the Foundation for Science and Technology (FCT), Portugal (UID/QUI/00100/2013, PTDC/QEQ-ERQ/1648/2014 and PTDC/QEQ-QIN/3967/2014 projects).

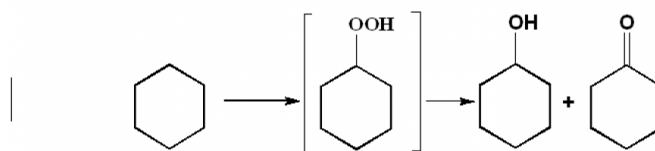
## FIGURES



**FIGURE 1**

Figure 1

Multiphasic mixture obtained by oxidation of cyclohexane with TBHP in [P6.6.6.14][DCA] catalyzed by ferrocene.



**FIGURE 2**

Figure 2

Cyclohexane oxidation

---

## KEYWORDS

Alkane functionalization | Ferrocene | Ionic liquid | Catalysis

---

## BIBLIOGRAPHY

[1] Mendes, M., Ribeiro, A.P.C.; Alegria, E.C.B.A.; Martins, L.M.D.R.S.; Pombeiro, A.J.L. Polyhedron, 2016, in press, <http://dx.doi.org/10.1016/j.poly.2016.10.037>

[2] Ribeiro, A.P.C., Martins, L.M.D.R.S, Hazra, S., Pombeiro, A.J.L., C. R. Chim., 2015,18, 758-765